



**OUTREACH
AND
EDUCATION**

OUTREACH AND EDUCATION

The Outreach and Education focus area addresses EV adoption by community members, with the emphasis on transitioning personal light-duty commuter vehicles to EVs and the necessary EV supply equipment (EVSE). Community outreach and education efforts on their own are not enough to significantly affect EV adoption. They are, however, pivotal in building support for regulatory or code updates, EV rebates, fleet adoption, and voluntary programs across all levels. Outreach and education efforts are also an essential step to providing community members with a basic introduction to EVs, raising community awareness about the purpose and importance of establishing a comprehensive EV program, and showing the public how transportation initiatives are related to other community issues like air quality, carbon reduction, and other specific energy goals.

This focus area and the associated toolkit topic areas can be a good reference for communities that want to initiate dialog with their stakeholders as well as to support and prepare community members for longer-term efforts. This approach may be helpful in communities with limited budget or limited political support for larger EV efforts. As community needs or public support increase, the community can expand its planning efforts to address engagement around other EV focus areas and topics.

The [Clean Cities Coalition Network](#) is a great resource for initiating outreach and education in communities nationwide. Clean Cities provides technical assistance, information resources, and connects local stakeholders — to advance the prevalence of alternative fuels in the transportation sector. Clean Cities Coalition partners include the Twin Cities (MN), Northern Colorado, Denver (CO) Metro, and Southern Colorado Clean Cities Coalitions.



Who Are the Target Audiences for Strategies Included in This Focus Area?

- Community residents who own or lease a light-duty vehicle for personal use
- Large employers and other businesses that could install charging stations for use by employees
- Multi-family residence building owners whose tenants are interested in EV charging at home
- Builders involved in new construction of residences and businesses
- Local dealerships selling or considering selling EVs

Key Messaging

- Reduced transportation costs from fuel savings and lower maintenance costs
- Improved air quality in community
- Attract residents or employees (multi-family and employers)
- Reduced GHG emissions (especially when paired with renewable energy)
- May be part of other planning efforts around climate and energy

Typical Barriers

- Up-front costs of vehicle or charging infrastructure
- Access to charging stations, especially for renters or residents in multi-family dwellings
- Exposure to and knowledge of EVs
- Difficulty navigating information and resources, sometimes caused by conflicting messaging and duplication of resources by multiple entities
- Accessibility of vehicles or vehicle types
- Range anxiety

What Are the Most Effective Outreach Channels for These Strategies?

- Websites
- Public meetings
- Social media campaigns
- Co-hosted events
- Co-branded campaigns with utilities or other platforms

Remote Engagement During COVID-19: Physical distancing doesn't mean you can't reach your community members in meaningful ways. By using remote engagement tools and techniques, you can connect with individuals in different locations and with varying access to resources. From creative social media marketing strategies to virtual Ride-and-Drives, there are many ways you can reach your community while staying safe. Explore the Partners in Energy Remote Engagement Toolkit to help you build your remote engagement strategy.

VEHICLES

Outreach strategies in this topic area focus on encouraging community members to learn about, purchase, and drive EVs for personal use. When community members switch to EVs, they reduce carbon emissions by about one-third, save money on fuel and maintenance costs, and improve local air quality (Xcel Energy, 2019).

Basic Information

There are three different types of EVs with varying levels of dependence on internal combustion engines (ICEs): 1) battery-electric vehicles (BEVs); 2) plug-in hybrid electric vehicles (PHEVs); and 3) hybrid electric vehicles (HEVs). The environmental and economic benefits of switching from a traditional ICE vehicle to an EV tend to be greater in BEVs than HEVs since BEVs do not use any fossil fuel — but the initial cost of a BEV is also typically higher. Battery cost is usually the main driver of EV price. BEVs have larger batteries than PHEVs or HEVs. As technological improvements continue, EV battery costs are decreasing. This could bring down up-front EV costs, making them comparable to ICE vehicles (Next 10, 2018). For more information on vehicle types and benefits of transitioning to EVs, see [Appendix A: Electric Vehicles 101](#).

First Steps and Quick Wins

Below are some low-effort initial strategies that you can use to encourage residents to learn about and purchase EVs. Strategies in this section can be implemented quickly and with limited financial investment.

Maintain an Up-to-Date Website

Develop and maintain a comprehensive EV website that allows residents, businesses, and visitors to easily access EV-specific information. The website should provide information about local public charging options, permitting for installation of residential and public charging stations, relevant building codes, and other local considerations or incentives (ICF, 2018). The website can also connect customers to external resources such as [Xcel Energy](#) for general [EV information](#), the [U.S. Department of Energy \(DOE\)](#) for [federal and state tax credit information](#), and additional [resource tools](#).

Examples:

- Xcel Energy maintains an EV website that provides up-to-date information on available models, incentives, and charging stations.
- The [Tahoe Regional Planning Agency](#) in the Lake Tahoe, CA, area hosts the [Tahoe Alternative Fuels website](#).
- A multi-agency collaboration in the [State of Oregon](#) runs the [Go Electric Oregon website](#).
- The New England nonprofit [Green Energy Consumers](#) offers the [Drive Green website](#).

Support Ride-and-Drive Events

Organize, facilitate, or host ride-and-drive events to offer customers an opportunity to get behind the wheel of an EV to personally experience the similarities and differences to typical ICE vehicles. According to Drive Electric Northern Colorado, 85% of customers who participate in ride-and-drive events have never driven an EV prior to the event and are 15% more likely to purchase an EV after the event (DENC, 2013).

Drive Electric is an existing program that helps arrange ride-and-drive events for businesses across the country. Independent programs are offered in Colorado and Minnesota, as well as nationally.

- [Drive Electric Northern Colorado](#) offers [workplace ride-and-drive events](#).
- [Drive Electric Minnesota](#) organizes both [private and public ride-and-drive events](#).
- [Drive Electric National](#) coordinates a national [annual celebration and outreach week for EVs](#).

Table at Local Events

Promote, facilitate, and attend local events to educate the community about types of vehicles, how and where to charge an EV, rebates, and resources by participating in or hosting a community event with tabling opportunities. Tabling events can range from community festivals and farmers markets to EV-specific events like the ride-and-drive events mentioned previously or community EV informational sessions. Distribute materials such as manufacturer information and utility rebate program details, as well as available state and national tax incentives. Contact Xcel Energy for materials or support.

Examples:

- The [Denver Department of Public Health and Environment](#) has an education and outreach campaign called [Denver Pass Gas](#) to provide residents information and exposure to EVs.
- Sample content about [understanding EVs](#) that you can use in developing flyers and handouts are available through [Xcel Energy](#).



Trusted Partners: Many minority and immigrant communities face limited English skills, cultural isolation, and a distrust of government; and, any of these issues can be barriers to engagement. To overcome these barriers, partner with local, trusted community groups that can help share the information in culturally relevant and accessible formats. For more guidance, reference *The Equity for All: EV Toolkit* published by the Greenlining Institute.

Outreach to Dealerships

The first point of contact for many drivers seeking guidance to make the transition from traditional ICE vehicles to EVs is dealership sales staff. Ensuring local sales staff are knowledgeable about EVs – including special features, information on charging (both at home and in public), and their benefits – can help dealerships increase sales and put customers at ease and ensure they are aware of available purchasing incentives and resources. In-person outreach is typically the most effective way to introduce dealerships to EV opportunities and resources, including:

- EV sales staff training
- Ride and Drive coordination
- Group Buy partnerships
- Xcel Energy's EV Trade Partners Network

Examples:

- [PlugStar](#) offers in-person and web-based EV dealer training for a fee in partnership with James Madison University.
- [Northern Colorado Clean Cities](#) conducts direct outreach to dealerships to share EV information and resources and to coordinate EV group buys.
- Dealerships who participate in the [Xcel Energy EV Trade Network](#) receive access to promotional support, EV training for sales staff, and other resources.

Larger Efforts and In-Depth Studies

The following strategies can be used to encourage vehicle procurement in your community through long-term efforts. These strategies may require additional planning, budget, or in-depth studies and collaboration.

Incentivize EV Purchases

Offering community-specific rebates, in addition to available tax credits and rebates, can help overcome the barrier of the high up-front costs for EVs. Communities can choose to target low-income households to help alleviate transportation burden or neighborhoods disproportionately affected by poor air quality. These programs can be beneficial for increasing participation in EV ownership through reasonable pricing.

Examples:

- [Riverside, CA](#), provides a rebate to residents who purchase a BEV, through the [Alternative Fuel Rebate Program](#).
- The [Sierra Club](#) and [Plug-in America](#) have developed a [sample rebate legislation template](#) for vehicle purchase rebates.



Equitable Incentives:

To ensure that EV incentives are distributed equitably, the [TransitCenter](#) foundation recommends structuring incentives to prioritize 1) low-income households, 2) households in rural and suburban areas that are less well-served by transit, and 3) smaller vehicles that consume less energy and reduce risks for pedestrians, especially children on neighborhood streets.

Organize a Group Buy

Partner with local dealerships to offer limited-time discounted pricing on EVs through a group buy. Group buys have been found to significantly boost EV sales, and the programs are seen as “an important tool for building momentum and accelerating market growth from the early adoption to the majority adoption phase, beyond which EVs will transition from the fringe to the mainstream” (Frommer, Toor, & Salisbury, 2018). Group buys are arrangements between communities or local organizations with local dealerships to offer discounts on vehicles — the community or organization is responsible for the outreach and promotion of the program in the community to encourage participation.

Examples:

- The [City of Fort Collins](#) partnered up with [Drive Electric Northern Colorado](#) to organize a [public group buy event](#) in 2019.
- [Wisconsin Clean Cities](#) partnered with Nissan North America and statewide utilities to promote a [group buy discount](#) from August 2, 2016, to September 30, 2017.
- [Boulder County's Sustainability Office](#) offers residents seasonal [discount programs](#) on EVs.

Conduct an EV Owners' Demographic Study

Conduct a demographic study of existing EV owners based on U.S. Census data to characterize the typical owner of an EV. This data can be used to identify those likely to purchase EVs within a county based on residential census blocks and to target outreach campaigns or plan infrastructure projects. Research shows that personal experience with EVs significantly increases a consumer's willingness to consider an EV for their next vehicle purchase (National Renewable Energy Laboratory, 2017).

Examples:

- The [Sacramento Clean Cities Coalition](#) developed the [Sacramento Electric Vehicle Readiness and Infrastructure Plan](#) in 2017, which provides typical characteristics of PEV owners in the community. (See page 15, along with a neighborhood map on page 16.)
- The Colorado Energy Office released an [EV Awareness Market Research](#) report to understand EV adoption beliefs, fears, barriers, needs for information, current sources of EV information, plans for EV purchases, and preferred vehicle types. The report helps CEO match messaging with different consumer segments to build awareness and support EV adoption.

SINGLE FAMILY RESIDENTIAL CHARGING INFRASTRUCTURE

Community strategies in this topic area focus on supporting residents installing chargers at home for use with personal vehicles. The U.S. DOE estimates that 80% of EV charging occurs at home, so encouraging installation of charging stations in single-family homes is a good first step to accelerate adoption of EVs for personal commuting (U.S. Department of Energy, 2019).

Basic Information

Single-family residents who buy an EV typically choose to install Level 1 or Level 2 vehicle charging stations in their homes depending on their patterns of vehicle use. For more information on charging types, see [Appendix A: Electric Vehicles 101](#). Homeowners should contact a licensed electrician to determine whether the existing electrical service can support vehicle charging or to identify what changes would be needed to safely install new outlets or home charging stations. The electrician may be required to get a building permit to complete any electrical upgrades. Homeowners can also choose to pair their EV charging with renewable energy options for emissions-free transportation. For more information on charging, visit: ev.xcelenergy.com/charging-101.

First Steps and Quick Wins

Listed below are some community strategies that can be used to immediately promote the installation of residential charging for use with personal EVs. Strategies in this section can be implemented quickly and with limited financial investment.

Outreach to Homeowners

Use existing outreach channels to provide homeowners information on the installation of EV charging stations in their homes. This information might include:

- How easy it is to charge at home
- How to choose the best charger for your needs
 - Level 1: Best for drivers who don't want to install additional infrastructure, don't drive long distances regularly, and can charge their vehicle at work or a nearby public charging station. Drivers can plug their EV directly into a standard household outlet and receive about 5 miles of range per hour (Valderrama, Madhur, Statler-Alum, & Garcia, 2019).
 - Level 2: Best for drivers who drive long distances regularly and don't have access to nearby public or workplace charging stations. Drivers can install a Level 2 charger for a cost, though some utilities may offer rebate, and receive about 25 miles of range per hour (Valderrama, Madhur, Statler-Alum, & Garcia, 2019).
- Expected increase in electricity costs due to EV charging
 - How does this compare to gasoline fuel costs?
 - What utility electricity rates are available to homeowners, and which are most advantageous for homes with EV charging?
- Local electricians familiar with EV charging installation
- Permitting process and anticipated costs

This information can be shared electronically through the community's website and social media or through handouts at community events or ride-and-drive events. For more information on charging, visit: ev.xcelenergy.com/charging-101.

Examples:

- [Xcel Energy](#) provides basic [information about charger types](#) and how to get started with a charging station installation at home.
- [U.S. DOE](#) offers homeowners [information on types of chargers and expected costs](#).
- The [City of Atlanta](#) provides a one-page handout [outlining the permitting process](#) for installing a charging station at home that could be adapted for your community.
- [Georgia Power](#) provides a handout that lays out [a three-step process](#) for installing a charging station at home (including identifying chargers needed, installing the station, and choosing the appropriate electricity rate).

Simplify Permitting

Encourage homeowners to install EV charging at home by simplifying the permitting process and reducing the cost for home installation. Best practices for streamlining the permitting process are outlined below (Center for Sustainable Energy, 2016).

1. Clear and consistent website information including clearly defined permit requirements in simple language
2. Simple applications that can be filled out and submitted online
3. Process checklists, used by both permit staff and applicants, that include:
 - a. Clear timelines for review process
 - b. Responsible party at each step
 - c. Standard fee
 - d. Single point of contact for applicants
4. List of common errors and resolutions to help ensure permit applications are approved on first submission
5. Online permitting platforms that allow the applicant to track the permitting process
6. User-friendly inspection scheduling

Examples:

- In the [EV readiness plan](#) by the [City of Fort Collins](#) a strategy to develop a residential EV charging permit process notification mechanism is described.
- The [City of San Diego](#) offers a [fact sheet](#) that outlines the process and expected fees.
- The [City of Atlanta](#) provides a [flowchart](#) that illustrates the permitting process.

Connect with Contractors

Provide outreach and training to local electricians to ensure that residents who want to install EV charging stations receive consistent and accurate information. This training may include (Electric Vehicle Infrastructure Training Program, 2019):

- Utility interconnect policies and requirements
- Charging station fundamentals
- Service-level assessments and upgrade implementation
- Integration of EV charging with distributed generation
- Internet Protocol networking and controls
- National Electrical Code standards and requirements
- National Fire Protection Association 70E and OSHA regulations
- National Electrical Installation Standards for EV equipment
- Troubleshooting, repair, and commissioning

These trainings may be conducted by qualified local government staff, a local higher education entity, or a third party. The community can invite electricians to complete the training and maintain a list of certified electricians on their website or in EV education and outreach materials. Check with Xcel Energy for potential training support.

Examples:

- The [Electric Vehicle Infrastructure Training Program \(EVITP\)](#) provides [training](#) across the United States and Canada.
- [U.S. DOE](#) provides a [handbook](#) for electrical contractors.

Larger Efforts and In-Depth Studies

Some residential charging strategies require additional planning, budget requests, or in-depth studies and could provide more traction and sustained growth and support.

Incentivize At-Home EV Charger Purchases

Offering community-specific rebates can help overcome the barrier of the high up-front costs for at-home EV chargers. Communities can choose to target low-income households to help alleviate the transportation burden since the cost of electricity needed to charge an EV can be one-third the cost of gasoline needed to fuel a similar ICE vehicle. Encouraging residents to install at-home chargers will increase EV ownership as more people will have reliable access to charging infrastructure.

Conduct an At-Home EV Charger Demographic Study

Overlay the existing EV owner demographic information with residential housing types and household income to identify those likely to install at-home EV chargers. With this information, develop targeted outreach campaigns or plan infrastructure projects in these areas.

MULTI-FAMILY CHARGING INFRASTRUCTURE

Community strategies in this topic area are focused on educating, encouraging, and supporting multi-family building owners and property managers around installing EV chargers to provide residents with access to personal vehicle charging. Multi-family buildings include condominiums, apartments, and housing cooperatives with five or more units.

As noted in the [Single Family Residential Changing Infrastructure](#), from 2012 to 2014, 80% to 90% of EV charging occurred at home (Idaho National Laboratory, 2015). About 40% of U.S. residents live in rental complexes with five or more units (United States Census Bureau, 2017). For these residents, the choice to install EV charging equipment is often not theirs to make. Unlike single-family homes, owners and managers of multi-family buildings must weigh unique considerations when installing EV charging equipment to attract and retain residents (Office of Energy Efficiency and Renewable Energy, 2019). Multi-family property owners and managers need to decide not only what type of chargers to install, but also if or how they will recover the cost of the investment or charging costs.

Basic Info

There are two types of chargers that multi-family building owners may choose to install on their properties: Level 1 or Level 2. (See [Appendix A: Electric Vehicles 101](#) for more information on charger types.) Property owners and managers should contact a licensed electrician to determine whether the existing electrical service can support vehicle charging or to identify what changes would be needed to safely install new outlets or charging stations. They may also be required to get a building permit to complete any electric upgrades required. Installation of charging stations will have to comply with the National Electrical Code, which has minimum requirements for safe installation of chargers in commercial buildings and large multi-family buildings across the nation (National Fire Protection Association, 2019).

In addition to considering what type of charging equipment to install (Level 1 or 2), property owners and managers must also consider charging station locations and fuel fee structures.

1. **Access:** Is the parking spot and charging infrastructure in a location and designed in a way that will allow people with physical disabilities to use the charging station?
2. **Charging Station Locations:** A property owner can choose to provide charging to residents at their designated parking stalls or allocate a section of the parking area for EV charging. If the charging is provided in their designated stalls, the residents will not have to compete for charging time. If the property owner chooses to select two or more spots for EV charging open to all residents, EV charging infrastructure costs can be reduced by choosing dual-head chargers, by locating the charging stations near existing electrical service, and by installing EV-ready infrastructure during construction or re-surfacing of parking lots. Codes, requirements, and preferences for locations of EV charging station in multi-family developments vary by community and should be followed.

3. **Fuel Fee Structure:** There are three options for property managers to collect fees for electricity use at charging stations (Kukkonen, 2019):
- Flat Fee:** In this case, the EV owner purchases an EV parking pass that has an added flat fee to pay for the anticipated energy use. This is the simplest option but can lead to significant overcharging or undercharging tenants for electricity use.
 - Submetering:** Many Level 2 chargers have Wi-Fi enabled controls that could let a property manager monitor the energy use of each charging station and charge the resident accordingly for designated parking stall charging. In the case of a shared charging area, third-party services can be used to facilitate payment on a per-charge basis (ChargePoint, 2019).
 - Pay as you go:** Multi-family building owners could also choose to partner with a third-party EV charging station supplier that provides at-the-station payment options, similar to public charging stations.

First Steps and Quick Wins

Listed below are some community strategies that can be used to provide education and promote installation of EV chargers in multi-family buildings for personal vehicle charging. Strategies in this section can be implemented quickly and with limited financial investment.

Outreach to Property Owners and Managers

Encouraging multi-family property owners and managers to install charging stations can be done through training, demonstration projects, market research, awareness building campaigns, and sharing of case studies. Of 1,000 multi-family housing residents surveyed across U.S. metropolitan areas, 24% of residents indicated a preference for properties with EV charging stations. Further, 17% of residents reported willingness to pay more for a dwelling that provided charging options (Advanced Energy, 2014). While property owners and managers stand to benefit from providing EV charging options, understanding these benefits, the market, and the decision-making process for installing chargers can be difficult to navigate.

Leveraging existing networks of property owners and managers, such as local multi-family housing associations, is a best practice for communicating EV charging options and benefits to residents. This network can also help identify and proliferate local case studies as well as help increase the speed at which success stories and lessons learned are shared. This information could be delivered through informational flyers, lunch-and-learn events, case study sharing meetings, or on a city or community website. Some EV service companies offer content for such learning events (e.g., [SemaConnect](#), [ChargePoint](#), [Clipper Creek](#)).

Examples:

- In 2020, [Northern Colorado Clean Cities](#) hosted free EV Ride & Drive events and Know Before You Go Electric workshops for workplace, apartments, and condo organizations.
- [MultiHousingCharging.com](#) compiled a [case study](#) of infrastructure installation at Live Green Apartments in St. Paul, MN.
- [Austin Energy](#) offers information regarding [outreach to multi-family properties](#) including benefits, rebates, steps for charging station installation, and a local [case study](#).
- [Advanced Energy](#) developed a [multi-family housing charging station handbook](#) that reviews common barriers to adoption, benefits of charging stations to building owners, and steps for installing charging stations.

Target Renters

Provide renters with tips and resources to approach their landlords about EV charging installations, much in the same way they advocate for building efficiency improvements. Most multi-family housing is composed of rental units, making up over 43 million households, or 36% of total household types in the United States. (National Multifamily Housing Council, 2019). As EVs gain popularity, more residents of multi-family buildings will be interested in owning EVs. Since these residents best understand their own driving patterns and charging needs, they can communicate effectively with their landlords or property management companies and accelerate the process of EV charging installations.

Examples:

- [California Plug-in Vehicle Collaborative](#) provides residents a [guide](#) for talking to their landlords about installing charging stations.
- [Advanced Energy](#) created a [step-by-step guide](#) for North Carolina residents to encourage the installation of charging stations at their buildings and includes charging station benefits as well as responses to common concerns.

Encourage EV-Ready Construction

Encourage building owners and developers to prepare for EV charging stations early by making parking spaces conduit-ready during construction. Making these investments at the time of construction or renovation will save money for property owners and managers, because it is easier to install wires and share material costs across multiple purposes (e.g., wiring for EV chargers as well as on-site solar or other new building HVAC equipment). This can save charging infrastructure projects as much as 75% compared to rewiring (Pike, Steuben, & Kamei, 2016). An education and outreach campaign is a good strategy in communities where there are no charging station standards.

EV-ready construction can also be mandated or encouraged through city codes or zoning ordinances. If EV-ready construction cannot be incorporated into city codes, it can be mandated in associate with requested exceptions or financing with a focus on benefits of planning for eventual usage levels. For more information on this strategy, see the [Policy](#) focus area section.

Examples:

- An [EVSE cost-effectiveness report](#) was developed for the City and County of San Francisco by [Energy Solution](#) regarding the costs and benefits of encouraging developers to install charging stations during initial construction rather than retrofitting later.

Larger Efforts and In-Depth Studies

To support long-term success for multi-family charging infrastructure, some outreach and education strategies may require additional planning, budget, or in-depth studies such as methods for combining charging with solar energy.

Integrate EV Charging and On-Site Solar

Encourage building owners to integrate solar photovoltaic (PV) energy with EV charging, which can complement the benefits of both technologies. First, solar PV can reduce the cost of charging vehicles by generating energy on-site. Second, the GHG emissions related to driving an EV depend on which resources are generating the electricity, such as natural gas or wind. Therefore, using solar PV to charge a vehicle can have a significant reduction in GHG emissions. Lastly, another benefit of pairing solar PV with EV charging is that it can reduce strain on the grid during hours of peak use. Depending on the structure of the time-of-day rates in your area, these benefits may be compounded further if users are not penalized with higher electric costs for daytime charging. The ability to take advantage of on-site solar, time-of-use rates, or other services vary by state.

Examples:

- The [National Renewable Energy Laboratory](#) developed the [REOpt Tool](#) to help size an on-site solar PV installation that incorporates EV charging loads and building electricity loads.
- [Great Plains Institute](#) published an [article](#) regarding the benefits of combining solar and EV charging.



EMPLOYER CHARGING INFRASTRUCTURE

Strategies in this topic area focus on supporting businesses to pursue installation of EV chargers for employees' personal vehicles, as well as for customers, visitors, and the broader public. For information on benefits of converting business fleet vehicles to electric, see the section on the Light-Duty Commercial and Municipal Fleets focus area.

Basic Information

The workplace is the second most common place for EV owners to charge their vehicles, surpassed only by at-home charging. Some employers choose to install EV charging infrastructure to provide a benefit to employees, accommodate the needs of visiting clients, and demonstrate environmental commitment. When installing charging stations, employers must balance the costs with time, capital improvement budget, operating budget, and lease considerations.

When an employer is deciding if they should offer workplace charging for employees, there are several things they should consider.

1. **Access:** Is the charging infrastructure for employees only or is it accessible to the general public and visitors as well? Is the parking spot associated with the charging station available for non-EV users if it is not in use? Is the parking spot and charging infrastructure in a location and designed in a way that will allow people with physical disabilities to use the charging station?
2. **Charger Type:** Typically, Level 2 chargers are the most suitable for a workplace, but Level 1 chargers may be appropriate for employees that will be plugged in for a full shift. For more information on charger types, see [Appendix A: Electric Vehicles 101](#).
3. **Price Structure:** A survey of 200 organizations across the country showed that 70% of workplace EV charging is provided as a free benefit to employees (U.S. Department of Energy, 2015). The employer could also choose to charge for use of the stations. This may be a more appropriate choice if the charging station is also available to visitors and the general public.
4. **Security:** When choosing the location for the charging station, the employer should ensure that proper security is in place to prevent vandalism and unauthorized use.
5. **Signage and Enforcement:** Signage should clearly state who can use the charging station, any applicable fees, and time limits. The employer should also be prepared to enforce these rules.
6. **Managing Access:** The company should also consider how it will manage access to the charging station if there are more employees wishing to take advantage of workplace charging than there are available charging stations. Examples of options employers have used include:
 - a. **Valet:** A parking attendant will move cars when the car has been charged or after a set amount of time.
 - b. **Assignment:** The charging station is assigned to multiple employees who coordinate sharing of the infrastructure.
 - c. **Reservation System:** An internal calendar can be set up and employees can sign up to use the charging station for specific time periods.
 - d. **Time Limit:** Use of each charging station is limited to four hours, allowing another employee to use the station for the second half of a standard work day.
 - e. **Employee Managed:** A listserv or email group is set up and EV owners manage access to charging among themselves. This can be a good option for a small company with limited resources for parking enforcement.

First Steps and Quick Wins

This section's strategies to support education and outreach for employer-sponsored charging infrastructure can be implemented quickly and with limited financial investment.

Outreach to Large Businesses

Develop an outreach campaign to encourage large employers to install charging stations as a benefit to employees. Large businesses and employers often have more staff and resources to focus on energy projects than smaller businesses and employers do. Moreover, some large businesses are part of a greater enterprise that is striving to meet corporate sustainability goals. For these reasons, installing EV charging infrastructure may appeal to large employers that occupy high-performing buildings and want stay on the leading edge of technology. For example, if these employers seek certification through LEED or other voluntary sustainable construction standards, designating parking for EVs and providing charging stations can help them earn certification points (U.S. Green Building Council, 2019).

Target industries may include hospitality, medical, and tourism sectors. As EVs continue to enter the market, hotels, hospitals, and local attractions can gain a competitive edge by offering patrons a place to charge their vehicles. For these types of employers as well as others, it is important to determine the appropriate type of charging equipment for the user. If charging equipment is intended for visitors, Level 2 or Level 3 chargers are often the preferred options, given the limited time for charging. If charging equipment is intended for employees, who also have access to charging at home, a Level 1 charger is likely enough (Gorzelay, 2018).

Examples:

- The [Minnesota Pollution Control Agency](#) published a [guide](#) for expanding workplace EV charging infrastructure that includes steps to start a workplace charging program, key benefits for employers and employees, and steps for installing charging stations.
- [Cal Start](#) developed a [report](#) that includes information on how to install charging stations at a workplace and also provides local case studies.
- The [New York State Energy Research and Development Authority](#) developed a [brochure](#) that outlines the benefits of workplace charging and describes how to install charging stations, including guidance on signage and payment structure.

Facilitate Peer-To-Peer Information Exchange

Engage local chamber of commerce, business associations, or other trusted networks for employers to share information with one another about EV charging programs. As with most emerging technologies, an initial skepticism must be overcome before a product can achieve widespread market adoption. One way to overcome perceived barriers is to share positive stories and anecdotal evidence. To encourage workplace charging, a community case study could be developed that highlights a group willing to share their experience with other employers and to possibly assist other interested businesses in navigating the decision-making process. These case studies can be captured and shared at in-person events, written as case study flyers, and featured online.

Going a step further, a local chamber of commerce, business association, or city could help facilitate a demonstration project that supports businesses in the charging station investment and the decision-making process. A demonstration project would provide hands-on experience for those who participate, as well as the opportunity to create a local case study that could be shared more broadly.

Examples:

- [Drive Electric Northern Colorado](#) offered a [workplace charging challenge launch and workshop](#) in 2015.
- Drive Electric Minnesota promotes electric vehicle adoption by providing workshops to inform stakeholders and promote sharing experiences across communities in Minnesota.

Recognize Local Businesses that have Workplace Charging

Encourage local businesses to install EV charging stations by recognizing their efforts through local green business programs or other local business recognition programs. This is a low-cost opportunity to promote the installation of EV charging stations. Case studies can be developed about local businesses who have installed charging stations to help encourage other businesses to follow suit.

Examples:

- The [City and County of Denver](#) offers the [Certifiably Green Denver](#) program to local businesses that implement sustainable practices.
- The [City of Winter Park, CO](#), promotes sustainable businesses through its [Winter Park Green Business Recognition Program](#).
- The [City of Saint Paul, MN](#), has the [Energize Saint Paul program](#), which provides resources as well as recognition for businesses that are taking energy actions.

Encourage EV-Ready Construction

Encourage businesses to prepare for EV charging stations early in the process by making parking spaces EV-ready during construction. Making these investments at the time of construction or renovation will save money for business owners and property managers, because it is easier to install wires and share material costs across multiple purposes (e.g., wiring for EV chargers with on-site solar or other new building HVAC equipment). This can save charging infrastructure projects as much as 75% for commercial applications compared to rewiring (Pike, Steuben, & Kamei, 2016).

Provide information on the benefits of EV-ready construction to local designers and builders to encourage them to include EV charging infrastructure in new construction or major renovation projects. This information can also be provided to building owners to encourage them to ask their contractors about possible upgrades.

EV-ready construction can also be mandated or encouraged through city code or zoning ordinances. For more information on this strategy, see the [Policy](#) focus area section.

Larger Efforts and In-Depth Studies

Educating employees about car sharing programs and on-site solar energy use are strategies that will result in more long-term efforts and may require additional planning, budget, or in-depth studies.

Promote Employee EV Car Sharing

Encourage large employers to host EV car sharing, which allows cars to be borrowed or rented by employees by the hour or day. This will help increase exposure to EVs, which is often a key precursor to EV purchase. This also offers convenience to employees who take public transit to work and lowers the carbon footprint of employees' vehicle miles traveled for work.

Examples:

- [Envoy](#) offers EV public car sharing opportunities in California and New York.
- [Maven](#) provides a range of car sharing options, including EVs, and can be found in cities in California and Michigan.
- [Hour Car](#) supports car sharing in Minneapolis–Saint Paul, MN.
- [ZipCar](#) can be found across the country and supplies a mix of vehicle options.
- [eGo CarShare](#) serves the Denver–Boulder metropolitan area in Colorado and has been integrating electrification into its fleet since 2018.

Integrate EV Charging and On-Site Solar PV

Encourage employers to integrate solar photovoltaic (PV) energy with EV charging, which can complement the benefits of both technologies. First, solar PV can reduce the cost of charging vehicles by generating energy on-site. Second, the GHG emissions related to driving an EV depend on which resources are generating the electricity, such as natural gas or wind. Therefore, using solar PV to charge a vehicle can have a significant influence on GHG emissions. Lastly, another benefit of pairing solar PV with EV charging is that it can reduce strain on the grid during hours of peak use. Depending on the structure of the time-of-day rates in your area, these benefits may be compounded further if users are not penalized with higher electric costs for daytime charging. The ability to take advantage of on-site solar, time-of-use rates, or other “make-ready” services may vary by state.

Examples:

- The [National Renewable Energy Laboratory](#) developed the [REOpt Tool](#) to help size an on-site solar PV installation that incorporates EV charging loads and building electricity loads.
- [Great Plains Institute](#) published an [article](#) regarding the benefits of combining solar and EV charging.

Resources

- [Xcel Energy](#) lists suggested [steps for installing EVSE](#) for building owners.
- [Xcel Energy](#) provides EV tools and resources to help educate and inform the EV curious with data and information on EV options, savings and support.
- The [U.S. Department of Energy](#) published a [workplace charging handbook](#) for hosting charging stations at places of work.
- [Alternative Fuels Data Center](#) was developed by the [U.S. Department of Energy](#) and offers calculators, interactive maps, and data searches to aid in decision-making.
- The [Regional Air Quality Council](#) and [Colorado Energy Office](#) offer businesses financial support for installing Level 2 and Level 3 charging stations.
- [Advanced Energy](#) created the [Residential Charging Station Installation Handbook](#) and the [Multifamily Housing Charging Station Handbook](#) for single and multi-family homeowners and renters.
- [Great Plains Institute](#) provides information about how to [make a city EV-ready](#) through permitting, policies, and codes.
- [MultiHousingCharging.com](#) offers [decision-making tools](#) to guide multi-family property owners.
- [Plug In America](#) is a nonprofit advocacy organization that offers informational material and guidance for customers interested in learning about purchasing EVs.
- [Charge Point](#) offers [informational tools](#) that show incentives and special electric rates that may lower charging costs by state, vehicle, and infrastructure.
- [Colorado Energy Office's ReCharge Colorado](#) program provides coaching services in every county in Colorado, to advance the adoption of EVs by connecting participants with resources, grant opportunities, and more.
- The [Clean Cities Coalition Network](#) provides education and outreach support, nationwide, to encourage electric vehicle adoption. Connect with your local coalition to identify upcoming events or opportunities for partnership.